

## UL TEST REPORT AND PROCEDURE

<b>Standard:</b>	UL 60950-1, 2nd Edition, 2007-03-27 (Information Technology Equipment - Safety - Part 1: General Requirements) CAN/CSA C22.2 No. 60950-1-07, 2nd Edition, 2007-03 (Information Technology Equipment - Safety - Part 1: General Requirements)
<b>Certification Type:</b>	Component Recognition
<b>CCN:</b>	QQGQ2, QQGQ8 (Power Supplies for Information Technology Equipment Including Electrical Business Equipment)
<b>Complementary CCN:</b>	QQJQ2, QQJQ8 (Power Supplies for Use in Audio/Video, Information and Communication Technology Equipment)
<b>Product:</b>	Switching Power Supply
<b>Model:</b>	ZWS50BAF-abcdef a = 3, 5, 12, 15, 24, 48. b = "/" or blank. c = "A", "L" or blank. d = "CO2" or blank. e = "FG" or blank. f = "FV" or blank.
<b>Rating:</b>	Input: 100-240 Vac, 50/60 Hz 0.45 A (for Model ZWS50BAF-3) 0.67 A (except for Model ZWS50BAF-3) Output: 3.3 Vdc, 10 A: Model ZWS50BAF-3 (2.64 - 3.63 Vdc, maximum 10 A, maximum 33 W) 5 Vdc, 10 A: Model ZWS50BAF-5 (4.0 - 5.5 Vdc, maximum 10 A, maximum 50.0 W) 12 Vdc, 4.3 A: Model ZWS50BAF-12 (9.6 - 13.2 Vdc, maximum 4.3 A, maximum 51.6 W) 15 Vdc, 3.5 A: Model ZWS50BAF-15 (12.0 - 16.5 Vdc, maximum 3.5 A, maximum 52.5 W) 24 Vdc, 2.1 A: Model ZWS50BAF-24 (19.2 - 26.4 Vdc, maximum 2.1 A, maximum 50.4 W) 48 Vdc, 1.1 A: Model ZWS50BAF-48 (38.4 - 52.8 Vdc, maximum 1.1 A, maximum 52.8 W)
<b>Applicant Name and Address:</b>	TDK-LAMBDA CORP NAGAOKA TECHNICAL CENTER R&D DIV 2704-1 SETTAYA-MACHI NAGAOKA-SHI NIIGATA 940-1195 JAPAN

This is to certify that representative samples of the products covered by this Test Report have been investigated in accordance with the above referenced Standards. The products have been found to comply with the requirements covering the category and the products are judged to be eligible for Follow-Up Service under the indicated Test Procedure. The manufacturer is authorized to use the UL Mark on such products which comply with this Test Report and any other applicable requirements of UL LLC ('UL') in accordance with the Follow-Up Service Agreement. Only those products which properly bear the UL Mark are considered as being covered by UL's Follow-Up Service under the indicated Test Procedure.

The applicant is authorized to reproduce the referenced Test Report provided it is reproduced in its entirety.

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Report Reference #

E122103-A90-UL

UL authorizes the applicant to reproduce the latest pages of the referenced Test Report consisting of the first page of the Specific Technical Criteria through to the end of the Conditions of Acceptability.

Any information and documentation involving UL Mark services are provided on behalf of UL LLC (UL) or any authorized licensee of UL.

Prepared by: Tomoko Fujii

Reviewed by: Tetsuo Iwasaki

### **Supporting Documentation**

The following documents located at the beginning of this Procedure supplement the requirements of this Test Report:

- A. Authorization - The Authorization page may include additional Factory Identification Code markings.
- B. Generic Inspection Instructions -
  - i. Part AC details important information which may be applicable to products covered by this Procedure. Products described in this Test Report must comply with any applicable items listed unless otherwise stated in the body of this Test Report.
  - ii. Part AE details any requirements which may be applicable to all products covered by this Procedure. Products described in this Test Report must comply with any applicable items listed unless otherwise stated in the body of each Test Report.
  - iii. Part AF details the requirements for the UL Certification Mark which is not controlled by the technical standard used to investigate these products. Products are permitted to bear only the Certification Mark(s) corresponding to the countries for which it is certified, as indicated in each Test Report.

### Product Description

The product is a switching power supply intended for building in to an end product.

### Model Differences

All models are identical except for input rating of Model ZWS50BAF-3, output ratings, and the following suffixes:

ZWS50BAF-abcdef:

a = 3, 5, 12, 15, 24, 48. b = "/" or blank. c = "A", "L" or blank. d = "CO2" or blank. e = "FG" or blank. f = "FV" or blank.

A: Addition of L shaped metal chassis mounted solder side of unit and cover.

CO2: Coating on both sides of PWB (not relied upon to reduce spacings).

FG: Low leakage option.

FV: Fixed output voltage without adjustment.

L: Addition of L shaped metal chassis mounted solder side of unit.

### Technical Considerations

- Equipment mobility : for building-in
- Connection to the mains : N/A
- Operating condition : continuous
- Access location : for building-in
- Over voltage category (OVC) : OVC II
- Mains supply tolerance (%) or absolute mains supply values : +10%, -10%
- Tested for IT power systems : No
- IT testing, phase-phase voltage (V) : N/A
- Class of equipment : N/A
- Considered current rating (A) : 20 A
- Pollution degree (PD) : PD 2
- IP protection class : IP X0
- Altitude of operation (m) : up to 3000 m
- Altitude of test laboratory (m) : less than 1000 m
- Mass of equipment (kg) : approximately 0.17 kg (except for suffix A and L) / approximately 0.3 kg (for suffix A) / approximately 0.27 kg (for suffix L)
- The product was submitted and evaluated for use at the maximum ambient temperature (T<sub>ma</sub>) permitted by the manufacturer's specification of: Maximum 70°C. See Enclosed Id. 7-02, 7-03, and 7-04 for details.
- The product is intended for use on the following power systems: TN

### Engineering Conditions of Acceptability

For use only in or with complete equipment where the acceptability of the combination is determined by UL LLC. When installed in an end-product, consideration must be given to the following:

- The following Production-Line tests are conducted for this product: Electric Strength
- The end-product Electric Strength Test is to be based upon a maximum working voltage of: Primary-SELV: 363 Vrms, 605 Vpk

- The following secondary output circuits are SELV: Outputs: 3.3 Vdc, 5 Vdc, 12 Vdc, 15 Vdc, 24 Vdc, and 48 Vdc
- The following secondary output circuits are at non-hazardous energy levels: Outputs: 3.3 Vdc, 5 Vdc, 12 Vdc, 15 Vdc, 24 Vdc, and 48 Vdc
- The power supply terminals and/or connectors are: Suitable for factory wiring only
- The maximum investigated branch circuit rating is: 20 A
- The investigated Pollution Degree is: 2
- Proper bonding to the end-product main protective earthing termination is: Required
- The following input terminals/connectors must be connected to the end-product supply neutral: Connector (CN1) (N) pin
- The following magnetic devices (e.g. transformers or inductor) are provided with an OBJY2 insulation system with the indicated rating greater than Class A (105°C): T1 (Class 130(B))
- The following end-product enclosures are required: Electrical and Fire
- The following secondary output circuits are ES1: 3.3 Vdc Output, 5 Vdc Output, 12 Vdc Output, 15 Vdc Output, 24 Vdc Output, and 48 Vdc Output
- The following secondary output circuits are at PS3: 3.3 Vdc Output, 5 Vdc Output, 12 Vdc Output, 15 Vdc Output, 24 Vdc Output, and 48 Vdc Output
- Humidity conditioning has been conducted by tropical condition.
- Classification of PIS has not been conducted. Therefore, all electrical components and conductors including printed wirings were assumed to be arcing/resistive PIS.
- This component has been evaluated in 'control of fire spread' method assuming appropriate fire enclosure is provided in end product. Unless the fire enclosure is made of non-combustible or V-0 material, the separation from the PIS shall be considered.

**Additional Information**

The IEC 60950-1: 2005 CB Test Certificate (Ref. Certif. No. JPTUV-035622) dated 2010-10-28 and Test Report (Ref. No. 12021748 001) dated 2010-10-27 were prepared by TUV Rheinland Japan Ltd.

This Test Report was based on the above CB Test Certificate and Test Report and was submitted by the CB Scheme. The test results and clause verdicts of the above noted report were reviewed and found to comply with the applicable Standard UL 60950-1:2007, Second Edition and CSA C22.2 No. 60950-1, 2nd Ed., dated March 27, 2007. As a result the clause verdicts and test results for this Test Report were noted as N/A and have been referred to the TUV Rheinland Japan Ltd. Test Report for details. All test data has been retained in UL's files.

**Additional Standards**

The product fulfills the requirements of: The product fulfills the requirements of: The product fulfills the requirements of: UL 62368-1, 2nd Edition, 2014-12-01, CAN/CSA C22.2 No. 62368-1-14, 2nd Edition, 2014-12.

**Markings and instructions**

Clause Title	Marking or Instruction Details
Power rating - Model	Model Number
Power rating -	Listee's or Recognized company's name, Trade Name, Trademark or File

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Company identification	Number
Fuses - Rating	Rated current and voltage and type located on or adjacent to fuse or fuseholder.